



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/547,561	04/12/2000	Gaetan L. Mathieu	P98-US	6320
50905 7590 12/17/2007 N. KENNETH BURRASTON KIRTON & MCCONKIE P.O. BOX 45120 SALT LAKE CITY, UT 84145-0120			EXAMINER GILMAN, ALEXANDER	
			ART UNIT 2833	PAPER NUMBER
			NOTIFICATION DATE 12/17/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ecowles@kmclaw.com  
kburraston@kmclaw.com  
patents@formfactor.com

## Office Action Summary

Application No.

09/547,561

Applicant(s)

MATHIEU ET AL.

Examiner

Alexander D. Gilman

Art Unit

2833

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11/06/2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 83-92 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 and 83-92 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-9, 14-18, are rejected under 35 U.S.C. 102(b) as being anticipated by WO/99/14404 (inventor - Chen et al).

Chen et al disclose (Fig. 2)

the interconnection element comprises:

a first element material (204) adapted to be coupled to a substrate, and

a second different element material (206) coupled to the first element material,;

such that while the second end of the first element material is released from

the substrate, the interconnection element has a first geometric shape before application of the external stimulus and a second geometric shape after application of the external stimulus, and the second geometric shape is different than the first geometric shape.

With regard to claims 9, Chen disclose that the second element is introduced by plating.

With regard to claims 14, 15, Chen et al disclose the second element comprises nickel or nickel alloy

With regard to claim 16, Chen et al disclose that the one of the first element material

and the second element material changes shape to a predetermined shape in response to the external stimulus.

With regard to claim 17, Chen et al disclose that the second element material changes shape to a predetermined shape in response to the external stimulus, and the second element material overlies the first element material.

With regard to claim 18, Chen et al disclose that the external stimulus reduces the magnitude of the stress of the material (col. 5, lines 19-21).

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Smith et al  
Smith et al (US Pat. 5,613,861) disclose (Fig. 13) the interconnection element (15) comprising:

a first element material (11) adapted to be coupled to a substrate, and  
a second different element material (19) coupled to the first element material,;  
such that while the second end of the first element material is released from  
the substrate, the interconnection element has a first geometric shape (the first shape is the interconnect 's shape after releasing it from the substrate) before application of a  
external stimulus) and a second geometric shape after application of the external stimulus,  
(which is a physical contact with 101, Fig. 6) and the second geometric shape is different than  
the first geometric shape.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-9, 14, 15, 18-21, 90,91 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al in view of WO/99/14404 (inventor - Chen et al).

With regard to claims 1-8, Smith et al (US Pat. 5,613,861) disclose (Fig. 13)

the interconnection element (15) comprises:

a first element material (11) adapted to be coupled to a substrate, and

a second different element material (19) coupled to the first element material,

(col. 4, lines 42-44); such that while the second end of the first element material is released from

the substrate, the interconnection element has a first geometric shape (the first shape is the interconnect 's shape after releasing it from the substrate but before application of the external stimulus) .

Smith et al do not disclose that the second geometric shape is caused by changing a volume of the second element material in response to heat

Chen et al (claims 67-71 ) disclose changing in structure of the material, which according to the current specification, (p. 23, lines 5-10) causes change in material volume.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a heat treatment of the deposited second material, as taught by Chen et al , to improve the interconnect's mechanical properties.( Chen et al, Abstract).

With regard to claims 9, 11, Smith et al (US Pat. 5,613,861) disclose the second element is introduced by plating and more specifically electroless plating (col. 6, lines 36-39 and col. 8, lines 61-62).

With regard to claim 10, Smith et al (US Pat. 5,613,861) disclose the second element is introduced by sputtering (col. 6, lines 39-40).

With regard to claims 14, 15, , Smith et al (US Pat. 5,613,861) disclose the second element comprises nickel or nickel alloy (col. 4, lines 44-46).

With regard to claim 18, Smith et al (US Pat. 5,613,861) disclose that the external stimulus reduces the magnitude of the stress of the material (col. 5, lines 19-21).

With regard to claims 19, 21, Smith et al (US Pat. 5,613,861) disclose that the element material has tensile and compressive stress and a deformation is a response to these stresses (col. 5, lines 11-21).

With regard to claim 20 Chen et al disclose (Abstract) using heat for reducing an inherent stress.

2. Claims 12, 13, are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al (US Pat. 5,613,861) in view of Eldridge et al.

Smith et al disclose all of the limitations except for the first element material comprising palladium or its alloy.

Eldridge et al (US Pat. No. 5,832,601) disclose the first element material comprising palladium or its alloy (col. 14, lines 6-10).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the Smith et al interconnection element comprising palladium or

its alloy, as taught by Eldridge et al, to improve wearing characteristics of the interconnection element.

Claims 83-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al (US Pat. 5,613,861) in view of Smith (US 5,979,892)

Smith et al (US Pat. 5,613,861) does not explicitly disclose that the interconnection element has an overall thickness greater than 1 micron, specifically 25 micronm 28 micron, and the thickness of the first element being 1-3, 5, 12-25 microns and second element has a thickness 3-6 micron.

Smith (US 5,979,892) disclose (col. 5, lines 30-38) that interconnect formed using microlithography can be formed into almost desired shape and the configuration of the interconnect should not construed as limiting invention.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to assign to the interconnect any of the specified configuration, as taught by Smith (US 5,979,892), to achieve the desired elastic and geometrical characteristics.

It was held that, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Swain et al., 33 CCPA (Patents) 1250, 156 F. 2d 239, 70 USPQ 412.

### ***Response to Arguments***

Applicant's arguments filed 7/12/2007 have been fully considered but they are not persuasive.

Applicants argue that Chen do et al do not disclose changing geometrical shape of the interconnect.

However, Chen et al teach "heat treatment " which "reorganize the material to to the new desired form" (Chen et al, Abstract). A term form means a shape and structure of an object (Heritage Dictionary, 4<sup>th</sup> Ed.). Since quantitative characteristics of the geometrical shape changing are not claimed, the rejection deems to be correct.

Regarding Smith et al over Chen et al rejection, it was submitted that the first geometric shape is a shape of the Smith et al interconnect element after releasing it from thje substrate but before applying external stimulus –heat. It was submitted that Chen et al provides the external stimulus which provides a shape changing.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander D. Gilman whose telephone number is 571 272-2004. The examiner can normally be reached on Monday-Friday, 10:30 a.m. - 8:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paula A. Bradley can be reached on 571 272-2800 ext. 33. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Application/Control Number:  
09/547,561  
Art Unit: 2833

Page 8

A handwritten signature in black ink that reads "Alex Gilman". The signature is written in a cursive style with a large, stylized "A" and "G".

**ALEXANDER GILMAN**  
**PRIMARY EXAMINER**